

ARBOVIRUS SURVEILLANCE, 2005

RHODE ISLAND

In Rhode Island, West Nile Virus (WNV) was first detected in tested dead birds during the summer of 2000. Since then, nine human cases (one death), 25 mosquito pools, 548 birds and five horses were identified. In 2005, one human case, one mosquito pool and two birds were positive for WNV. Rhode Island also recorded 2 positive Eastern Equine Encephalitis (EEE) findings in an equine and an emu. The following report summarizes in detail the 2005 season in Rhode Island.

RHODE ISLAND METHODS

Human surveillance

The Rhode Island Department of Health is the lead agency responsible for conducting human case surveillance for arboviral encephalitis, meningitis, and meningoencephalitis. Starting June 1 and at least until October 31 (ending date to be determined based on ongoing epidemiological findings), RI HEALTH asks health care providers, emergency rooms and hospitals to report cases of encephalitis, aseptic or suspect viral meningitis over the age of 17 years, or Guillain-Barre syndrome. The RI Department of Health Laboratory's normal viral testing menu for arboviruses includes human serology and cerebrospinal fluid assays for WNV, EEE, SLE (St. Louis Encephalitis) and LE (LaCrosse Encephalitis). Communicable Disease nursing staff screen reports to determine if the clinical presentation meets the case criteria for arboviral neurological illness. If the case meets surveillance criteria, the hospital laboratory will be contacted and requested to submit the appropriate diagnostic specimens for testing. The nursing staff assure the collection of convalescent sera on all suspected case-patients with encephalitis of unknown etiology.

Veterinary surveillance

Veterinarians are required to report any suspected animal cases with neurological illnesses to DEM, Office of Agriculture. The State Veterinarian assists community veterinarians to arrange testing for WNV or EEE in horses that have severe neurological disease.

Mosquito surveillance

From the beginning of June to early October, an average of 30 trap sites were set weekly with CO2-baited CDC light traps and/or gravid traps. Overnight mosquito collections were done and females were sorted by species into groups of 50 or less. Trapping was expanded where "clusters" of WNV and EEE positive birds were found, positive mosquito pools, or if human cases were detected. Mosquito pools were assayed (via RT-PCR and cell culture, with IFA confirmation) weekly for WNV, EEE, and other selected viruses at the HEALTH Laboratory. Mosquito surveillance ended on October 8, 2005.

Avian surveillance

It was publicized for Rhode Island residents to call DEM's dead bird surveillance hotline to report crows, bluejays, or robins that appear to have recently died and that show no signs of external injury. Although only a few samples of birds that meet these criteria will be retrieved

for testing, DEM mapped the locations of all birds reported in order to identify areas where additional mosquito trapping and testing might be needed. Birds meeting testing criteria were transported daily to the HEALTH Laboratory for necropsies. PCR assays were conducted at the HEALTH Laboratory. Dead bird surveillance ended in early October.

RESULTS

Human Surveillance

From May 19 to December 19, 2005, the HEALTH Lab tested 128 acute serum specimens, 27 convalescent specimens and 131 cerebrospinal fluid specimens from 156 persons with suspect WNV infection. Of those tested, three patients were reported with encephalitis, and the rest of the patients were reported as aseptic meningitis (age > 17 years).

On September 16, 2005 the Rhode Island Department of Health (HEALTH) announced confirmation of the state's first human case of West Nile Virus (WNV) since 2003. The case of WNV occurred in a 65-year-old male from Providence who recovered at home. Exposure to a WNV-infected mosquito occurred sometime between August 14 and August 26, 2005, with a 3 to 15 day period between exposure and illness. The patient did not travel out of state, for any significant length of time. This is the eighth human case of WNV in RI since monitoring began in 2000.

Veterinary Surveillance

Eastern Equine Encephalitis (EEE) was detected in two veterinary animals during the 2005 season.

The first EEE isolation was found in a horse, stabled at Lincoln Woods State Park, in the Limerock area of Lincoln. The horse became ill on August 19 and was euthanized on August 22. Confirmatory tests were received by the State Veterinarian from the National Veterinary Services Laboratory in Ames, Iowa. The horse was probably infected during the week previous to its death. It was housed at a public riding stable and found to be unvaccinated

The second EEE isolation was found in a 19 year-old male emu, which had been vaccinated for EEE and West Nile Virus, that became ill on September 22 at Roger Williams Park Zoo in Providence. Positive tests were received by DEM on September 29 from the veterinary staff at the zoo. The emu exhibited neurological symptoms of EEE and was later euthanized. The emu was probably infected during the weekend of September 17-18.

The State Veterinarian was also aware of a second horse that tested negative for WNV and EEE.

Mosquito Surveillance

A total of 1466 mosquito pools (11,113 mosquitoes) were submitted for arboviral testing in 2005. Approximately 42.6% of all pools were collected in Washington County, 18.9 % in Providence County, 28.5% in Newport County, and 7.6 % and 2.4% in Kent County and Bristol County, respectively. See Table 1 for the distribution of all collected mosquito pools by county.

Table 1: Mosquito surveillance by county, 2005, Rhode Island			
County	# pools collected (# mosquitoes)	# WNV Positive pools (Mosquito species)	# EEE Positive pools (Mosquito species)
Bristol	63 (269)	0	0
Kent	179 (840)	0	0
Newport	290 (3168)	0	0
Providence	320 (2098)	1 (<i>Aedes vexans</i>)	0
Washington	615 (4738)	0	0

The first and only WNV positive mosquito pool (*Aedes vexans*) was trapped in the Fox Point Section of Providence. The type of species that tested positive for West Nile Virus bites both mammals and birds. The positive mosquito pool was trapped on September 19th. Following the positive finding DEM set extra mosquito traps in the area but no other positive mosquitoes pools were detected.

One pool of mosquitoes trapped in South Kingstown on September 19th tested positive for Highlands J virus. Highlands J virus, while not affecting humans, is an indicator that environmental conditions are appropriate for the transmission of other mosquito-borne viruses, such as Eastern Equine Encephalitis. However, no pools tested positive for EEE in 2005. The distribution of mosquito species collected for testing can be found in Table 2.

Table 2: Mosquito surveillance by species, 2005, Rhode Island

Scientific Name	Number Pools Collected	Number of Mosquitoes	Number of positive WNV pools (Number in pools)	Number of positive EEE pools (Number in pools)
<i>Aedes cinereus</i>	20	38		
<i>Aedes vexans</i>	179	1822	1 (3 in pool)	
<i>Anopheles punctipennis</i>	65	210		
<i>Anopheles quadrimaculatus</i>	46	237		
<i>Anopheles walkeri</i>	9	17		
<i>Anopheles</i> sp.	3	3		
<i>Coquilleltidia perturbans</i>	188	2583		
<i>Culex erraticus</i>	2	3		
<i>Culex pipiens</i>	58	292		
<i>Culex restuans</i>	54	198		
<i>Culex salinarius</i>	20	87		
<i>Culex territans</i>	4	7		
<i>Culex</i> sp.	47	215		
<i>Culiseta inornata</i>	1	1		
<i>Culiseta melanura</i>	82	448		
<i>Culiseta morsitans</i>	21	49		
<i>Culiseta</i> sp.	9	18		
<i>Ochlerotatus abserratus</i>	1	13		
<i>Ochlerotatus atropalpus</i>	1	1		
<i>Ochlerotatus aurifer</i>	8	27		
<i>Ochlerotatus canadensis</i>	119	1126		
<i>Ochlerotatus cantator</i>	83	283		
<i>Ochlerotatus communis</i>	20	51		
<i>Ochlerotatus dianiaetus</i>	1	1		
<i>Ochlerotatus excrucians</i>	26	76		
<i>Ochlerotatus intrudens</i>	2	8		
<i>Ochlerotatus j. japonicus</i>	34	63		
<i>Ochlerotatus provocans</i>	13	20		
<i>Ochlerotatus punctor</i>	4	7		
<i>Ochlerotatus sollicitans</i>	70	554		
<i>Ochlerotatus sticticus</i>	20	31		
<i>Ochlerotatus stimulans</i>	34	150		
<i>Ochlerotatus taeniorhynchus</i>	96	2033		
<i>Ochlerotatus triseriatus</i>	57	171		
<i>Ochlerotatus trivittatus</i>	20	75		
<i>Orthopodomyia signifera</i>	6	7		
<i>Psorophora ferox</i>	13	89		
<i>Uranotaenia sapphirina</i>	29	93		

Avian Surveillance

From mid June to late September 2005, 108 dead birds were reported to DEM MAC. 28 birds were submitted for testing. See Table 3.

Table 3: Avian Surveillance, by county, Rhode Island, 2005				
County	Number of birds tested	Number of positive birds		
		WNV	EEE	TOTAL
Bristol	2	0	0	0
Kent	8	0	0	0
Newport	3	1	0	0
Providence	10	1	0	0
Washington	4	0	0	0
Unknown	1	0	0	0
TOTAL	28	2	0	2

Of the 28 avians tested, 8 were crows, 4 were blue jays, 6 were robins and 10 were "other" birds. The season's first isolation of West Nile Virus in a bird was found on September 21 in a crow collected from Portsmouth. Following this positive finding, additional mosquito traps were set in the area but no other positive mosquitoes were detected. A cardinal, collected from the Rumford area of East Providence on September 27, also tested positive for West Nile Virus. Of the 28 birds tested, no birds were positive for EEE.

Comparison of National and Rhode Island WNV Surveillance

1999	28 counties in 4 states reported any WNV activity
2000	136 counties in 12 states & DC reported any WNV activity
2001	358 counties in 27 states & DC reported any WNV activity
2002	2,480 counties in 44 states & DC reported any WNV activity
2003	1,890 counties in 46 states & DC reported any WNV activity
2004	47 states, DC, NYC and PR reported any WNV activity
2005	48 states, DC, NYC and PR reported any WNV activity

Reported Human WNV Disease Cases, United States, 1999-2005 YTD*					
Year	Cases	Deaths	States	Counties	Onset Dates
1999	62	7	1	6	August 2-September 24
2000	21	2	3	10	July 20-September 27
2001	66	9	10	40	July 13-December 7
2002	4156	284	39 & DC	708	May 19-December 14
2003	9862	264	46 & DC	1079	April 14 – December 5
2004	2539	100	40, & DC & NYC	505	April 23 – November 16
2005	2949	116	42, & DC & NYC		January 2 – December 16
* 2005 YTD totals are as of 2/14/2006					

Reported Human WNV Disease Cases, Rhode Island, 1999-2005		
Year	Number of persons tested	Number of persons positive for WNV
1999	0	0
2000	42	0
2001	43	0
2002	82	2
2003	120	7
2004	134	0
2005	156	1

WNV Surveillance, US, 1999-2005*, Summary of Mosquito Data					
Year	# of positive pools	# of species	Earliest + pool	States	Counties
1999	18	6	9/12/99	3	8
2000	515	17	7/7/00	5	38
2001	919	27	5/31/01	16 & D.C.	70
2002	6033	29	5/22/02	33 & D.C.	---
2003	8384	51	1/18/03	41 & D.C.	944
2004	8759	49	2/10/04	38 & D.C.	420
2005	11485	39	1/21/05	41 & D.C.	411
* 2005 YTD totals are as of 2/14/2006					

WNV Surveillance, Rhode Island, 1999-2005, Summary of Mosquito Data					
Year	# of collected pools	# positive pools	Number of species	Earliest + pool	Counties
1999	0	0	0	0	0
2000	1113	0	0	0	0
2001	1856	14	8	7/16/01	3
2002	1417	4	3	8/28/02	2
2003	2383	7	2	8/21/03	3
2004	3062	0	0	---	---
2005	1466	1	1	9/19/05	1

WNV Surveillance, US, 1999-2005 YTD*, Summary of Dead Bird Data			
Year	# of positive birds	States	Counties
1999	249	4	28
2000	4305	12 & D.C.	136
2001	7332	26 & D.C.	328
2002	15,745	42 & D.C.	1888
2003	12,066	44 & D.C.	1689
2004	7396	47 & NYC	983
2005	5344	45	592
* 2005 YTD totals are as of 2/14/2006			

WNV Surveillance, Rhode Island, 1999-2005, Summary of Dead Bird Data					
Year	Number of birds reported	Number of birds tested	Number of birds positive	Earliest + reported	Counties
1999	0	0	0	0	0
2000	1466	365	88	8/14/00	4
2001	1324	390	245	5/30/01	5
2002	1441	249	167	6/17/02	5
2003	651	75	47	8/14/03	5
2004	257	58	5	8/12/04	2
2005	108	28	2	9/21/05	2

WNV Surveillance, US, 1999-2005* YTD, Summary of Equine Data			
Year	# of equine cases	States	Counties
1999	25	1	2
2000	63	6	26
2001	731	19	125
2002	12038	39	1678
2003	5145	40	1271
2004	1441	38	421
2005	1139	37	382
* 2005 YTD totals are as of 2/14/2006			

WNV Surveillance, Rhode Island, 1999-2005, Summary of Equine Data			
Year	# of equine cases	County	Month of onset
1999	0	---	---
2000	1	Washington	August
2001	0	---	
2002	1	Kent County	October
2003	3	Providence (1), Washington (2)	September
2004	0*	---	---
2005	0*	---	---

* WNV was not detected, however EEE was detected in one horse in both 2004 and 2005.